

EPA EMPOWER PROJECT

Introduction:

The majority of U.S. fossil fuel-fired electricity generating units submit quarterly reports on their hourly nitrogen oxides (NO_x), sulfur dioxide (SO₂), and carbon dioxide (CO₂) emissions along with select operating parameters (e.g., hourly heat input, gross electricity generation). EPA's Clean Air Markets Division (CAMD) makes these data available through a variety of online reports and applications.

As part of the EmPOWER Air Data Challenge, CAMD is partnering with academic institutions to promote environmental education, specifically, to explore opportunities to use CAMD data in high school or university classrooms. Georgia Tech has been selected to participate in the challenge. You will receive support from EPA CAMD staff experts to answer questions and assist you with CAMD tools and data analysis. In addition, you can expect to receive national recognition by being featured on the EmPOWER Air Data Challenge webpage.

Project Description:

You will use publicly available data to demonstrate the effect of air pollution control strategies on emissions from the power sector. You will focus on a single facility, and build a data-driven narrative for that facility. The final product is a website targeting the general public (high-school level education). Control strategies may include choice of fuel, combustion conditions, fuel pre-treatment, and/or post-combustion removal of emissions.

Your website should address:

- Brief technical descriptions of pollution control methodologies;
- Timelines and reasons for implementing the select technologies;
- A brief description of the monitoring techniques used to ensure compliance;
- Evidence of reduced emissions that result from the control strategies; and
- Total emissions in comparison to other facilities and/or national averages.

Group selection:

Group selection is in Canvas on a first-come first-serve basis. You may use Canvas to send messages to group members and share files, but it is not required. The list of facilities is below:

- Plant Scherer in Juliette, GA is the largest point source of CO₂ in the United States. Flue-gas desulfurization and selective catalytic reduction have been added in the past decade.
- Plant Bowen in Euharlee, GA is one of the largest coal-fired power plants in North America. The facility uses electrostatic precipitators and selective catalytic reduction.
- Plant McDonough-Atkinson in Smyrna, GA replaced coal units with natural gas units in the last decade. Current emissions controls include dry low emission technology and selective catalytic reduction.
- Albany Green Energy in Albany, GA is a cogeneration steam and power plant which runs on locally sourced biomass. Their control methods include dry sorbent injection, baghouse filters, and selective noncatalytic reduction.

EPA EMPOWER PROJECT

Project components:

Work Plan- This is a single document submitted as a group. It outlines the website layout and includes preliminary sketches (by hand/cartoon is fine) of figures that will be generated. For each figure, the anticipated data sources and potential software packages should be listed. This document also includes a list of assigned tasks. Each student should produce at least two figures. Please note that each of the bullet points above do not necessarily each amount to two figures. There should be a specific plan to ensure the final product is cohesive. This may be printed out or emailed to Dr. Kaiser. Emails should be sent before the start of class on **Oct 17**.

First Submission- This is not a draft. It will be assessed according to the rubric below. The website url and a note that this the website is ready for review should be emailed to Dr. Kaiser before **11:59pm Nov 12**. No edits are to be made until after the review period.

Review- Each individual will review a different group's website. A review starts with a summary of the content as understood by the reviewer. It then addresses both the content and delivery. A review may point out errors, or ask for more information or clarification if needed. Reviews will be emailed to Dr. Kaiser and will then be anonymously given to each team. Emails should be sent before the start of class on **Nov 19**.

Final Submission- Revisions will be made according to peer feedback from the review as well as instructor feedback from the first submission grade. The website url and a note that this the website is ready for review should be emailed to Dr. Kaiser before **11:59pm Nov 26**.

Need help...

... writing for the general public?

Dr. Lisa Rosenstein from the CEE communications program will provide a mini-lecture on **October 3** to start you out. Most of your information should be communicated through your figures. Your work needs to be understandable and captivating enough to hold the attention of a high school student.

... accessing data?

Dr. Jeremy Schriefels, branch chief at the EPA, is here to help you navigate the data (bios at <https://www.linkedin.com/in/jschreifels> and <https://www.rff.org/people/jeremy-schreifels/>). He will be in class on **October 8**. You should know what data you will need to access before this class begins.

Additionally, we will host Dr. Schriefels for a round-table discussion about careers at the EPA and think tanks on **October 8 at 11:00am**. This time is specifically set aside for you to ask questions about life after college and working in the public sphere. Dr. Kaiser will send out an RSVP to get a head count. This event is not required, but highly recommended. It is open to students outside the class.

... making a figure?

Ximin Mi, a data visualization librarian, will be holding office hours specifically for this project on **October 10** during class time (3rd floor Crossland). She is able to set up additional appointments as needed (email xmi7@gatech.edu). Visit <http://libguides.gatech.edu/dataviz/intro> to learn more about the available resources.

... making a website?

If you can type, you can make a website. Several intuitive drag-and-drop interfaces exist. You are free to use any of them. I highly recommend Google Sites – anyone with a google account can set up the website and share it with select collaborators. Just go to <https://sites.google.com/> to start. If you need help setting up a website, Dr. Kaiser can assist during office hours or the dedicated project class time.

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Rubric:

Topic	Total Points	Criteria
Work Plan	10	<p><u>Project scoping (group score, 5 pts):</u> Will the planned work provide a complete narrative? Is the work equally split, with at least two figures per person? Is there a plan to make the final product cohesive?</p> <p><u>Individual planning (individual score, 5 pts):</u> Are the sketched or preliminary figures appropriate for addressing the individual's subtopic? Are they well thought out, including notes of data sources and potential software packages?</p>
First Submission	60	<p><u>Overall Content and Delivery (group score, 10 pts):</u> Is the narrative complete? Is it well organized and cohesive?</p> <p><u>Specific Content and Delivery (individual score, 50 pts):</u> Does the content provided by the individual accurately and completely address individual's assigned subtopic as outlined in the work plan? Do the figures quickly and clearly portray the main points? Is the information well-written at a level appropriate for the target audience?</p>
Review	15	Is it clear that the reviewer carefully read the material? Does the reviewer address the content and the delivery? Is the feedback he or she provides constructive, complete, and useful? Will the final product be improved as a result of the review process? (individual score)
Final Website	15	Did the authors address all comments from the reviewer and instructor? Has there been substantial effort to improve the content and/or the delivery? Is the final website cohesive? Is it a useful resource? (group component: 5 pts; individual subtopic: 10 pts)
Total	100	20 Points group-based, 80 Points individual-based